

NASA Glenn Expertise Allows Manufacturer to Remain Competitive



TECHNOLOGY

The NASA Glenn Research Center's material characterization equipment and expertise is among the best in the country. Cast Tools, Inc., a small specialty foundry in Racine, Wisconsin, worked with NASA Glenn to characterize oxidation that was forming on the surface of stainless steel molds. NASA Glenn provided Cast Tools with the exact composition and inexpensive and simple recommendations on how to improve the process to eliminate the oxidation.

COMMERCIAL APPLICATION

Cast Tools produces intricate cast iron molds for industrial customers who expect high quality and extreme accuracy. In response to customers' demands for better thermal cycling performance, Cast Tools created a new process in stainless steel to extend the life of the mold while preserving accuracy. However, the new process led to the formation of unexpected and severe pitting and oxidation on the mold's surface. These finished products would not meet the quality requirements of Cast Tools' customers.



The NASA Glenn Garrett Morgan Commercialization Initiative (GMCI) and GLITeC assembled a team of metallurgy experts at NASA Glenn to address Cast Tools' problem. NASA Glenn used its material characterization equipment and expertise to put sample molds through a battery of tests that greatly extended Cast Tools' diagnostic capabilities. These tests revealed the oxidation's surface chemistry, elemental composition, surface roughness, micro-hardness, and morphology. Consultants in GLITeC's network of industry experts determined that the oxidation could be remedied through simple, inexpensive changes in the casting process. After making these changes, Cast Tools produced two batches of specialty molds that showed a 90 percent improvement in surface appearance. Cast Tools is now implementing additional changes recommended by NASA Glenn to maximize the quality of their products.

SOCIAL/ECONOMIC BENEFIT

With NASA Glenn's assistance, Cast Tools has been able to remain competitive in an extremely volatile industry and introduce its products to two new markets. The company sold the initial order of molds and has already received a new order for a large number of stainless steel molds. Cast Tools estimates that using their proprietary casting process they will realize a 25 percent increase in sales over the next five years.

NASA APPLICATIONS

Materials used in space missions must be thoroughly characterized for both mechanical performance and reactivity in the space environment. NASA Glenn's materials expertise and research enables safe and efficient spaceflight.

Point of Contact:



glitec@battelle.org
Phone: 216/898-6400
Fax: 216/898-6550
20445 Emerald Parkway Drive, S.W.
Cleveland, OH 44135



ttp@grc.nasa.gov
Phone: 216/433-3484
Fax: 216/433-5531
21000 Brookpark Road
Cleveland, OH 44135